and the needs of physics are so great that no time should be lost. We, in this Society, can never be too grateful to Professor Williamson for having led the storming party to victory which established our system of abstracts; he foresaw that when such a scheme was successfully launched it was bound to become self-supporting, and such has long since proved to be the case. Let us hope that the physicists have at their disposal some one equally bold and far-sighted, who will overcome the fears of the timid, and initiate a thoroughly comprehensive scheme. Chemists are directly interested in the work, as we are bound to take notice of the progress of physics, and the want of an English record is much felt by us. We had no society with cognate aims to help us, so that the physicists are in a far stronger position than we were, as the Institution of Electrical Engineers should be prepared to forward such a cause. I believe it will be found to be of the utmost importance to them to do so. Indeed, the electrical engineer of the present day, I fear, is fast becoming a specialist of the deepest dye: having had experience of several hundreds, I know that when a student he is most difficult to deal with, as he will only pay attention, even in physics, to what he believes to be of immediate importance to him; as to chemistry, he will scarce notice it, forgetting, or not realising, that the whole field of electro-chemistry is yet untilled. It is, therefore, very necessary that no effort should be spared to make the electrical engineer better informed regarding physics generally. . . .

"The Royal Society of London has recently issued to the scientific world a circular having reference to the preparation of complete catalogues of science by *international co-operation*, which raises questions of such importance that I do not hesitate to reproduce it.

"'Sir,—The Royal Society of London, as you are probably aware, has published nine quarto volumes of *The Catalogue of Scientific Papers*, the first volume of the decade—1874-83—having been issued last year.

"'This catalogue is limited to *periodical* scientific literature, *i.e.* to papers published in the transactions, &c., of societies, and in journals; it takes no account whatever of monographs and independent books, however important. The titles, moreover, are arranged solely according to author's names; and though the Society has long had under consideration the preparation of—and is hoped may eventually issue as—a key to the volumes already published, a list in which the titles are arranged according to subject-matter, the catalogue is still being prepared according to author's names. Further, though the Society has endeavoured to include the titles of all the scientific papers published in periodicals of acknowledged standing, the catalogue is—even as regards periodical literature—confessedly incomplete, owing to the omission of the titles of papers published in periodicals of little importance or not easy of access.

"'Owing to the great development of scientific literature the task of the Society in continuing the catalogue, even in its present form, is rapidly increasing in difficulty. At the same time it is clear that the progress of science would be greatly helped by—indeed, almost demands—the compilation of a catalogue which should aim at completeness, and should contain the titles of scientific publications, whether appearing in periodicals or independently. In such a catalogue the title should be arranged not only according to authors' names, but also according to subject-matter, the text of each paper and not the title only being consulted for the latter purpose. And the value of the catalogue would be greatly enhanced by a rapid periodical issue, and by publication in such a form that the portion which pertains to any particular branch of science might be obtained separately.

"'It is needless to say that the preparation and publication of such a complete catalogue is far beyond the power and means of any single society.

"'Led by the above considerations, the President and Council of the Royal Society have appointed a committee to inquire into and report upon *the feasibility of such a catalogue being compiled through international co-operation.*

"'The Committee are not as yet in a position to formulate any distinct plan by which such international co-operation might be brought about; but it may be useful, even at the outset, to make the following preliminary suggestions:—

"'The catalogue should commence with papers published on or after January 1, 1900.

"'A central office, or bureau, should be established in some place, to be hereafter chosen, and should be maintained by international contributions—either directly, that is, by annual or other subsidies—or indirectly, that is, by the guarantee to purchase a certain number of copies of the catalogue.

"'This office should be regularly supplied with all the information necessary for the construction of the catalogue. This might be done either by all periodicals, monographs, &c., being sent direct to the office to be catalogued there, or by various institutions undertaking to send in portions of the catalogue already prepared, or by both methods combined.

"'At such an office, arrangements might be made by which, in addition to preparing the catalogue, scientific data might be tabulated as they came to hand in the papers supplied.

"'The first step, however, is to ascertain whether any scheme of international co-operation is feasible and desirable. The Committee, accordingly, is desirous of learning the views upon this subject of scientific bodies and of scientific men.

"'We, therefore, venture to express the hope that you will be so good as, at some early opportunity, to make known to us, for the use of the Committee, your own views on the matter.

"'Should the decision you report be in any way favourable to the scheme, may we further ask you to communicate to us, for the use of the Committee, any suggestions which you may think it desirable to make, as to the best methods of inaugurating such a scheme, as to the constitution and means of maintenance of the Central Office, as to the exact character of the work to be carried on there, as to the language or languages in which the catalogue should be published, and the like?

"'We are,
"'Your obedient servants,
"'M. FOSTER, *Secretary R.S.*
"'RAYLEIGH, *Secretary R.S.*
"'J. LISTER, *Foreign Sec. R.S.*'

"If any such scheme as is here foreshadowed could be carried out, it would obviously be of the greatest value to the world and productive of much saving, both of time and treasure But the subject is full of difficulty, owing to the very numerous interests concerned. I trust, however, that when the time comes to deal with the chemical section—and, indeed, in the case of any future catalogue of chemical work, that we shall not be satisfied with a mere alphabetical arrangement, but that we shall classify the subject-matter alphabetically in sections, so as to lighten the labour of ascertaining the state of knowledge in any particular group. Already we do not know very many of the names recorded in our indexes, and, in the future, we shall be ignorant of a still larger proportion, unless our system of nomenclature be made so significant that each name will explain itself; and in the case of an alphabetical arrangement, substances belonging to the same group, having names with different initial letters, occur interspersed throughout the index: so that it is a matter of the greatest difficulty, if not impossible, by consulting such an index, to ascertain the references to all the members of the group. An alphabetical index also affords no indication of the extent to which knowledge of any particular group has increased during the interval covered by it; and, in fact, it only becomes of real use when provided with a key, such as Beilstein affords, in which the names of the known members of any particular group may be first looked up before consulting the alphabetical index. Also, in using a lengthy alphabetical index it is very easy to miss entries, and it is necessary to pay far more attention when consulting it than is the case when one of limited extent is used.

"I do not believe that there would be any real difficulty in arriving at a system of classification which, at all events, would limit a reference to comparatively few pages. We are told that by the Bertillon system, dealing with the card records of 90,000 convicts, it is possible—when the necessary measurements have been taken—to ascertain whether a prisoner has been before convicted, as it may be said, with considerable, if not absolute, confidence, that, in that case, his card will be found in a drawer containing only about 400. Surely, we ought to be able to devise a system which would equally limit our search."

THE WORK OF HERTZ.

Additions and Corrections to the Lecture reported last week, by
DR. OLIVER LODGE.

ON page 135, middle of first column, the word "clearly" ought to have been *probably*; for I am by no means clear that the gradual discharge of negative electrification from the

© 1894 Nature Publishing Group

clean surface of metals under the action of light is really a chemical phenomenon. It had been asserted by some experimenters that the most oxidisable metals acted most powerfully, but my own experience renders this doubtful; I now find that gold platinum and carbon discharge with very fair rapidity, and that nearly all substances have some discharging power. A few materials, cobalt among metals, discharge positive electrification more rapidly than negative. The whole matter is therefore now under investigation.

In the foot-note to same column, end of first paragraph, the word "even" should be deleted. The assertion intended is that dried soil discharges rapidly, while damp soil discharges only slowly.

Same page, middle of second column, "two years ago" should be *four years ago;* since Fitzgerald's Royal Institution Lecture was delivered in March 1890, and reported in NATURE of June 19 the same year.

Lower down, the name Kolaček, preceding that of D. E. Jones, has been omitted.

Page 138, second column, with reference to the reflecting power of different substances it may be interesting to give the following numbers, showing the motion of the spot of light when 8 inch waves were reflected into the copper hat, the angle of incidence being about 45°, by the following mirrors:—

Sheet of window glass	0, or at most 1, division.
Human body	7 divisions.
Drawing board	12 ,,
Towel soaked with tap-water ...	12 ,,
Tea-paper (lead ?)...	40 ,,
Dutch metal paper	70 ,,
Tinfoil	80 ,,
Sheet copper	100 and up against stops.

Page 139. It would have been clearer if the penultimate paragraph, beginning "To demonstrate," had run thus:—

To demonstrate that the so-called plane of polarisation of the radiation transmitted by a grid is at right angles to the electric vibration, *i.e.* that when light is reflected from the boundary of a transparent substance at the polarising angle the electric vibrations of the reflected beam are perpendicular to the plane of reflection, I use, &c.

The following is a copy of one of the wall-diagrams; it is interesting as showing how numerous the now-known detectors of radiation are:—

DETECTORS OF RADIATION.

Physiological	Chemical	Thermal	Electrical	Mechanical	Microphonic
Eye	Photographic Plate	Thermopile	Spark (Hertz)	Electrometer (Blyth and Bjerknes)	Selenium (?) Impulsion Cell (Minchin)
×Frog's leg (Hertz and Ritter)	Explosive Gases	Bolometer (Rubens and Ritter)	{ Telephone, Air-gap and Arc } (Lodge)	Suspended Wires (Hertz and Boys)	Filings (Branly)
	Photo-electric cell	Expanding Wire (Gregory)	Vacuum Tube (Dragoumis)		Coherer (Hughes and Lodge)
		Thermal Junction (Klemencic)	Galvanometer (Fitzgerald)		
			Air-gap and Electroscope (Boltzmann)		
			Trigger Tube (Warburg and Zehnder)		

× The cross against the frog's leg indicates that it does not appear really to respond to radiation, unless stimulated in some secondary manner. The names against the other things are unimportant, but suggest the persons who applied the detector to electric radiation. The query against Selenium is placed there because of uncertainty as to its most appropriate column.

STUDY OF FLUID MOTION BY MEANS OF COLOURED BANDS.[1]

IN his charming story of "The Purloined Letter," Edgar Allan Poe tells how all the efforts and artifices of the Paris police to obtain possession of a certain letter, known to be in a particular room, were completely baffled for months by the simple plan of leaving the letter in an unsealed envelope in a letter-rack, and so destroying all *curiosity* as to its contents; and how the letter was at last found there by a young man who was not a professional member of the force. Closely analogous to this is the story I have to set before you to-night—how certain mysteries of fluid motion, which have resisted all attempts to penetrate them, are at last explained by the simplest means and in the most obvious manner.

This indeed is no new story in science. The method adopted by the minister, *D.*, to secrete his letter appears to be the favourite of nature in keeping her secrets, and the history of science teems with instances in which keys, after being long sought amongst the grander phenomena, have been found at last not hidden with care, but scattered about, almost openly, in the most commonplace incidents of everyday life which have excited no curiosity.

This was the case in physical astronomy—to which I shall return after having reminded you that the motion of matter in the universe naturally divides itself into three classes.

(1) The motion of bodies as a whole—as a grand illustration of which we have the heavenly bodies, or more humble, but not less effective, the motion of a pendulum, or a falling body.

(2) The relative motion of the different parts of the same fluid or elastic body—for the illustration of which we may go to the grand phenomena presented by the tide, the whirlwind, or the transmission of sound, but which is equally well illustrated by the oscillatory motion of the wave, as shown by the motion of its surface and by the motion of this jelly, which, although the most homely illustration, affords by far the best illustration of the properties of an elastic solid.

(3) The inter-motions of a number of bodies amongst each other—to which class belong the motions of the molecules of matter resulting from heat, as the motions of the molecules of a gas, in illustration of which I may mention the motions of individuals in a crowd, and illustrate by the motion of the grains in this bottle when it is shaken, during which the white grains at the top gradually mingle with the black ones at the bottom—which inter-diffusion takes an important part in the method of coloured bands.

Now of these three classes of motion that of the individual body is incomparably the simplest. Yet, as presented in the

---

[1] A lecture delivered at the Royal Institution of Great Britain by Prof. Osborne Reynolds, F.R.S.

© 1894 Nature Publishing Group